Amendments to the Specification:

Please replace the paragraph beginning on page 28, line 3, with the following rewritten paragraph:

In the fourth embodiment, a pick-up coil 44 and a capacitor 45 are installed as shown in the vertical sectional view of ~~Fig. 22~~Fig. 23. A portion of the RF antenna 16 is projected to the outside of the vacuum chamber 11. Therefore, the pick-up coil 44 and the capacitor 45 may be preferably located close to the projected portion so that they may not be eroded by the plasma. The pick-up coil 44, which is used to measure the current, can be located either on the grounded side or on the power-supplied side of the antenna 16. As shown in ~~Fig. 23~~Fig. 22, a bridge circuit 46 is connected to each of the pick-up coil 44 and the capacitor 45 to convert the alternating-current (AC) signal generated by the pick-up coil 44 and the capacitor 45 into a direct-current (DC) signal. Alternatively, a wave detector that detects an AC signal and generates a DC signal may be used in place of the bridge circuit. In addition, there is a controller 47 that receives the aforementioned signals and generates a signal for regulating the impedance value of the impedance element 41 (Fig. 20).